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DR. SAMUEL W. FRANCIS,
AN
INAUGURAL DISSERTATION
ON
INTERMITTENT FEVERS.

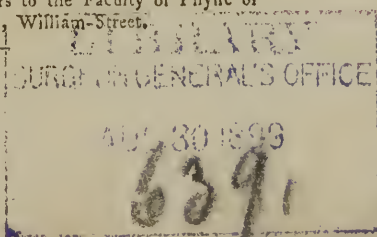
SUBMITTED TO THE PUBLIC EXAMINATION
OF THE
FACULTY OF PHYSIC,
UNDER THE AUTHORITY OF THE
TRUSTEES OF COLUMBIA COLLEGE,
IN THE
STATE OF NEW-YORK,
WILLIAM SAMUEL JOHNSON, LL. D. President;
FOR THE DEGREE OF
DOCTOR OF PHYSIC,
ON THE SIXTH DAY OF MAY, 1794.

By EDMUND LUDLOW,
Citizen of the State of New-York.

Ad utilitatem vitæ omnia consilia factaque nostra dirigenda sunt.
TACIT.

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—1794.—



TO
RICHARD BAYLEY,
PROFESSOR OF ANATOMY

IN
COLUMBIA COLLEGE,

*HAVING pursued my Medical Studies under your
Auspices, permit me to dedicate to you the First Fruits,
as a mark of the respect and esteem of*

Your Friend and Pupil,

EDMUND LUDLOW.

TO THE
MEDICAL FACULTY
OF
COLUMBIA COLLEGE,

THIS
DISSERTATION

IS INSCRIBED
AS A MARK OF RESPECT.

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A
D I S S E R T A T I O N
O N
INTERMITTENT FEVERS.

THE obvious revolutions taking place in the regions of science, at the present day, when described to future ages, will designate this happy æra, and adorn with brilliant rays its great promoters. These arduous improvers of science have drawn it from the hidden recesses of obscurity, illuminated its mysterious phænomena, and exposed to view the extensive and curious operations of Nature's economy.

It must doubtless afford the highest gratification to the reflecting mind, who views these efforts
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of modern industry; and produce a lasting regret in him, whom Nature has not calculated to lend a mite to the general fund of rising science.

Physic seems to have derived her proportionable share of elucidation from this important change, and is simplified by the few heads under which diseases are now arranged.

In contemplating the variety of disorders incident to human nature, from the tender and delicate organization of her parts, we may, with propriety, compare her to a well regulated machine, whose complex parts are yet severally liable to be impeded by causes apparently the most trivial, which, from the general dependency of all those parts, render it incapable of performing its minutest functions. Thus, man formed by Nature for each social enjoyment, justly styled *Lord of the Creation*, blessed with each requisite to make pleasant those few fleeting years allotted for his transfiguration through life, we repeatedly observe easily transported

transported from his happy career into the bosom of disease, and there transformed into a child of misery, until he returns to mother earth.

These considerations naturally lead the indefatigable and accurate observer of human nature, to an inquiry into the causes of disease, upon which their prevention and cure totally depend. This is the office of the Physician, the end of whose labor is the attainment of means for the relief of the numerous diseases incident to his fellow creatures. *Intermittent fevers* have particularly excited the attention of many, with a view of investigating the nature and particular operation of *miasmata*, or *marsh effluvia*, in the production of its singular effects. This disease, originating from its influence, and frequent in many parts of this country, is well worthy to be known and understood, since few are the happy climes which can boast of being exempt from its scourge, and many are the victims who fall a sacrifice at its shrine.

History of the Disease.

PRINGLE observes, that the inhabitants of a great proportion of the United Provinces, with Dutch Brabant, are equally subject to intermittent fevers with those of Flanders. But he remarks it more frequent in the province of Zealand, from its situation being naturally low and watery; the beaches of eastern and western Scheld, and the marshy parts of that country contributing to this effect. From this circumstance, almost every breeze carried to it, adds a large proportion to its native moisture; and what increases still more the unhealthiness of the situation, is the soil being overflowed during a great part of the year. As the water is evaporated by the heat of the sun, a muddy and slimy surface is exposed, together with a great quantity of putrifying animal and vegetable matter, increasing the unsalutary tendency of the climate, by tainting the atmosphere with impure and noxious vapours. He
likewise

likewise observes, that in proportion to the mildness or heat of the summer, diseases of this nature assume a more dangerous, or favorable appearance.*

These noxious and moist exhalations, operated upon by heat, have been observed to be alone sufficient for the production of intermittent fevers: when exhalations are of the more mild kind (*i. e.* impregnated with a less quantity of *azote*, and more of *oxigene gas*, which we have reason to believe is its composition, attended with a moderate degree of heat and moisture,) intermittents then appear in the form of a mild tertian. This kind I shall more particularly notice, since it has come under my observation in the suburbs of the city of New-York, more especially in the vicinity of the Fresh Water Pond. This pond is situated in a low

* See Pringle on the Air and Diseases of Low Countries, ch. i. p. 2, 3, 6.

Linn on Diseases in Southern Climates, sect. x. p. 54. is of the same opinion with Pringle, that heat and moisture seldom fail of producing intermittents.

low marshy place, and serves as a reservoir to collect the waters of the adjacent meadows. It is rendered more filthy by the constant ablution of putrid hides, by the tanners, who have a number of vats on the borders of the pond. The surrounding atmosphere is frequently impregnated with the exhalations arising from this water, and its marshes; and great numbers of the neighbouring inhabitants experience its unfriendly effects in summer and autumn, the seasons most favorable for its operation.

Diagnosis.

INTERMITTENT fevers are placed by the celebrated CULLEN, in his arrangement of diseases, in the class *pyrexia*, order *febres*. His definition is—

“ Febres, miasmate paludem ortæ, paroxysmis
 “ pluribus, apyrexia, saltem remissione evidente
 “ interposita,

“ interposita, cum exacerbatione notabili, et ple-
 “ rumque cum horrore redeuntibus, constantes:
 “ paroxysmo quovis die unico tantum.”*

It may be necessary, in the first place, to point out in what particular these fevers differ from all others; that, upon their occurrence, they may, with more facility, be distinguished. They are known to return at regular periods, with increased exacerbations, after the patient has been free from them for one or more days.

The person, upon the first attack, is observed to be affected with the following symptoms: a sense of uneasiness, and difficulty of motion—recollection a little impaired—a diminution of strength—a paleness of the countenance—a considerable degree of thirst—a dryness of the mouth—the colour of the urine pale—with a roughness of the skin, commonly called *cutis anserina*—a heaviness and pain in the head, back and loins—
 a cold-

* Culleni Synopsis Nosologiæ Methodicæ.

a coldness of the extremities—a violent shaking of the limbs and trunk of the body—a loathing of all kinds of food, particularly animal—vertigo—nausea, and frequently attended with a discharge of bilious matter from the stomach, and often by stool: under these circumstances the functions of the body are generally impaired, and more particularly those which are termed natural. When most of the above symptoms have abated, the hot stage succeeds, and the skin becomes dry and parched, which is ushered in by alternate warm flushings and chills—the urine becomes high coloured, but deposits no sediment—as the heat increases, there is a fulness and tergefcence of the face—a warmth is felt throughout the whole body, and the skin assumes more of its natural appearance—at length the sweat breaks out, first on the forehead, then extends itself gradually over the whole surface of the body. After a copious flow of perspiration for some time, the heat of the body gradually diminishes; and this takes place sooner or later, according to the quantity of the perspiration.

perspiration. If the sweating be profuse, the fever sooner terminates; whilst a scanty perspiration protracts it to a more considerable length. These symptoms cease, and the functions slowly return to their natural state, leaving the patient in a state of indirect debility. Such are the appearances which constitute what is generally called a paroxysm; or fit of an intermittent fever, and is divided into three stages, known by the names of the *cold*, *hot* and *sweating* stages; during all which time the respiration is difficult, and becomes relieved towards the conclusion of the symptoms.

This leads us to investigate the changes produced in the vital functions, which are the following: the pulse is observed to be slow, and irregular, on the commencement of these symptoms; and, as the heat advances in its progress to the sweating stage, the pulse becomes more regular, hard and full, and returns upon the approach of the sweating stage, nearly to its natural standard,

standard, which is known to be about seventy strokes in a minute.

A fever, consisting of a single paroxysm, seldom occurs; the time which elapses from the end of one paroxysm to the beginning of another, is termed an *intermission*, and from the beginning of one paroxysm to the beginning of another, an *interval*; when they consist of more than one paroxysm, the intervals are nearly equal.*

There are three genera of intermittent fevers, known by the general appellation of the *Tertian*, *Quartan*, and the *Quotidian*; each of these are characterised by the frequency of the return of its paroxysms.

1st. The *tertian*, being the most frequent in kind, will be more particularly attended to; the duration of its paroxysm is observed to be
about

* Cullen's First Lines of the Practice of Physic, p. 11, 12.

about twelve hours, beginning with an interval of forty-eight hours, returning every third day, commencing its attack at noon: these symptoms form the regular tertian; though sometimes the paroxysms will continue for a shorter or longer time, and vary in their return: these deviations will consequently form *varieties*, and, from their seldom appearing, will be passed over without farther notice.

2d. The *quartan* presents itself on the fourth day, with a similar paroxysm to the Tertian; but differs in its interval, which is most frequently seventy-two hours, having the accession in the afternoon.

3d. We next proceed to an enquiry into the *quotidian*, which arises every day and is observed with similar paroxysms, with an interval of twenty-four hours, coming on in the morning; we not unfrequently find this, as well as the other forms before noticed, complicated with a

variety of diseases, unnecessary, for the purpose of this confined sketch, to enumerate.

It may be observed, with respect to the form or type of fevers, that the quartan, while it has the longest interval, has, at the same time, the most violent cold stage, but the shortest paroxysm: the tertian, having a shorter interval than the quartan, has likewise a shorter and less violent cold stage, but the paroxysm much longer; the quotidian has the shortest interval, the least cold stage, but the longest paroxysm.*

Causes.

A DIVISION of these into *remote* and *proximate*, may appear the most proper. The remote includes the *predisponent*, and *exciting* or *occasional* causes. These require the immediate skill of the Physician, as being evidently of the utmost importance in the restoration of the patient to health.

Predisponent

* Cullen's First Lines, p. 15.

Predisponent Causes.

THESE are numerous : a few, therefore, will be related, as sufficient to designate them from the exciting causes.

Debauches of all kinds.

Nocturnal watchings.

Fatigue of long continuance, either of mind or body.

Depression of the spirits.

Exposure to the vicissitudes of the weather.

Food not sufficiently nutritious, and in small quantities.

The sedative power of cold.

Those enfeebled by labor and want of nourishment, are observed to be more exposed to attacks of intermittent fevers than others, who, on the contrary, are well clad, and frequently cheer themselves with the bottle.* In fact, any operation upon the mind, or body, capable of producing debility, is sufficient for the purpose of predisposition.

Exciting

* Brown's Elements of Medicine, p. 278.

Exciting Causes.

THESE may be referred to *marsh effluvia*, or *miasmata*, arising from fens, or low marshy places, in which animal and vegetable matter resides in a rotten state, and by the assistance of a certain proportion of caloric, enables the unhealthy process of putrefaction to be carried on, in the greatest degree, as consequent to fermentation. In this dissolution, we have reason to believe there is disengaged a much greater quantity of those gases found by experiment to be unfit for respiration, which reside in a greater or less degree in all animal and vegetable bodies, viz. *azote*, *carbone* and *hydrogene* than of *oxigene*, which, upon life being extinct, exists in a smaller proportion than the others, though indispensably necessary for the purpose of respiration. The contagion, when generated in the above manner, is absorbed by the surrounding atmosphere, as we know it holds in solution, every thing that is capable of being volatilized from off the earth; and when it be-

comes

comes superfaturated with the atmosphere, and meets with a sufficient degree of heat and moisture, it is rendered active, and is capacitated for its operation on the human body, in what precise manner I shall not pretend to say, any farther than the general supposition, which is from its sedative effects producing a greater or less degree of fever, in proportion to the virulence of the contagious matter applied to the human body.

Proximate Cause.

HAVING examined into the remote causes, our next inquisition is into the *proximate* cause.

Many opinions have been offered to the world, to account for the cause of intermittent fevers; but, being merely speculative and illy supported, have consequently fallen to the ground; one is, that a noxious matter was generated within the body, and, in consequence of the efforts
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of nature, called by CULLEN, the *vis medicatrix naturæ*, to expel the matter, fever was produced. Others have asserted, that bile was the cause, from the circumstance of its being evacuated, in large quantities, on the commencement of the fit; together with many other opinions equally futile. These ideas are now thoroughly exploded, and the discharge of bile can be accounted for by the violent action of the stomach, emulging the biliary ducts.

As a solution of this cause cannot be exactly ascertained, and appears to have been a subject of much speculation among men of the greatest talents, in the medical line, and still remains involved in the utmost obscurity, we must permit it to rest, in its present unrevealed state, and continue to grovel in the dark, with the feeble aid of hypothesis to guide the pursuit.

There appears an evident dependency of causes throughout the disease: thus a sedative power, known by the name of *miasmata* in the schools
of

of physic, is applied to the human body, in what particular form we know not; neither can its mode of reception be ascertained: some have supposed it to be taken immediately into the lungs in the act of respiration, others through the pores of the skin, or through the medium of the *saliva*, I will not take upon me to determine which of the three opinions is the most probable, but am rather inclined to think it is received through the pores of the skin, since, in dropsy, we find a great disposition for absorption from the atmosphere by the absorbents on the surface of the body, which, in this manner, operate on the nervous system. It is well known, that in dropical habits a much greater quantity of water is collected in a given time, than is taken in at the mouth; this can be accounted for but on two principles, either by absorption from the atmosphere, as before-mentioned, which, when the moisture is greater, it has been frequently determined more water will be collected and *vice versa*: or, in consequence of the chemical change that takes place

place within the body, when, in respiration, *oxigene gas* is taken into the lungs, it there meets with *hydrogene*, and, by their union, form water, which we know is its composition. In either of these ways the increase may be accounted for; but the former hypothesis I am inclined to adopt, since through that channel it appears to me contagion may more readily exert its baneful influence, in producing the cold stage, upon which the hot depends; for by curing the cold we produce a dissolution of the disease.

From a view of the phænomena attending this disease, it must appear, that the proximate cause ought to be sought for, in the cold stage; and must therefore be traced, to a peculiar kind of debility. This cause seems to operate as a powerful sedative, in diminishing the action of the heart and arteries: thus, *the warm stage* is caused by the *cold*, and the latter by *debility*, which circumstances evince the immediate connection between the three different stages.

Whether

Whether the contagion, after its reception into the system, continues in a passive state, or commences its operation immediately, I cannot learn: though a knowledge of it may be of great moment in checking fevers in the bud.

Prognosis.

TO determine with accuracy and precision, the various terminations of intermittents, may be of some consequence to the Physician, since true or false predictions may have a tendency either to increase or disparage his skill in the public opinion: this leads him to note every particular occurrence, during the progress of the disease, to enable him the more readily to form his opinion with respect to the result, and ward off each impending mischief.

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It has been observed not unfrequently to change its form into a dangerous continued fever, which is more peculiar to plethoric habits, and occurs in the fall of the year. At other times it ends in jaundice of various species, and sometimes in *phthisis pulmonalis*.

A *coma* frequently occurs, and is supposed to be owing to a compression of some portion of the substance of the brain, or of its medullary fibres. Some think it probable that a *lentor* of the fluids, in the vessels of the brain, is the cause: others attribute the compression to an increased *impetus* of the blood to those part. This, it may be allowed, is approaching nearer the mark in accounting for *coma*.

The occurrence of *delirium* may be explained upon the principle of a diminution of the energy of the brain. In three cases, related by PRINGLE, when some of his men were attacked with inter-
mittent

mittent fevers, he ordered them immediately to be bled; the consequence was a high degree of delirium about two hours after. This shows that the energy of the brain was diminished by this treatment, in addition to that already induced by contagion,

It rarely terminates in death, but, when it does, it depends upon the want of a sufficient degree of excitement in the nervous system, and happens in the cold fit. It may, however, on the contrary, destroy life by proving too great a *stimulus*; or, agreeable to BROWN, destroy the excitability.

If the pulse be frequent, it is difficult to determine whether it depends upon irritation or debility. We judge of the excess of *stimulus* from the fulness and frequency of the pulse; when frequent and strong at the same time, the contents of the heart are supposed to evacuate at each pulsation; and when it continues at one hundred and eighteen or twenty for several days; or when
there

there is that peculiarity of pulse called the intermittent, which is known by its constantly varying as to the strength and fulness of each pulsation, alternating from quick to slow, from full to hard, and beating at irregular intervals, with a tendency of the fluids to putrefaction, from the cadaverous smell of the body, fætid stools, disagreeable breath, *petechæ* on the skin, and *hemorrhage* from different parts. These are inevitable proofs of approaching dissolution.

When those fevers which have come under my observation have terminated favorably, I never observed them to take place at stated periods, called by HIPPOCRATES critical days, neither could I discover any remarkable evacuations; they were noticed to cease in the ordinary way of a paroxysm, with some trifling deviation; such as the patient having a better night's rest than usual, and not being attended with delirium; or by profuse sweats, terminating the paroxysm without any farther return of the disease.

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They sometimes terminate in *mania*, of which instances are not rare.

Method of Cure.

IN the cure of diseases, it is necessary to keep constantly in view the train of cause and effect; since, by the removal of the cause, the effect ceases, and the disease ends.

One of the first indications is to shorten the length of the paroxysms; another is to remove all things that may have stimulant effects, thirst particularly, which may be obviated by indulging the patient with cool diluting drinks; and another to remove the contents of the stomach, particularly if there be reason to believe the presence of bile, which frequently is thrown up in large quantities,
and

and, from its sedative effects, increases the disease. The symptoms will then be the following, a foul appearance of the tongue, with the surface rough, a bitter and disagreeable taste in the mouth, attended with frequent retchings, and dislike to all kinds of food. At this time, we should have recourse to gentle emetics, such as the emetic tartar in small quantities, or ipecacuanha; perhaps the latter may have the preference, as its effects are not so debilitating: these may be used with another advantage, which is determining to the surface, and bringing on a free perspiration. Many of the diaphoretics may be used with the same intent; among which are the celebrated James's powders, the principal part of the composition of which is supposed to be antimony, united to a small portion of nitre, the good effects of which are frequently seen, given in the dose of ten or fifteen grains, at the commencement of the warm stage, or latter end of the cold, by its producing a different action in the system, determining to the surface, and bringing on the sweating

sweating stage. It is seldom necessary to repeat it more than two or three times.

The use of opium, obtained from the *papaver somnifera* of LINNÆUS, is very valuable, and will not be passed over unnoticed, in taking off the irritability of the system frequently accompanying intermittents, together with its diaphoretic qualities, given at the time of accession.

RUSH, of Philadelphia, in his treatment of intermittents, appears to be much prejudiced in favor of blood-letting in a moderate quantity, in the advanced stages of the disease: when the bark and other remedies have proved ineffectual, he has found it yield to this alone.

It is a doubt with me, whether it may be practised, in the advanced stages, with any degree of safety, since the debilitating effects of the fever already induced in the system, may seem too great to warrant it; if practised at all, it would appear
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the most proper in the early stages, and confined to those cases in which a great degree of *inflammatory diathesis* is present, by removing it, to prepare the system for the reception of the bark, with other tonic and astringent medicines, among which are the *gentian*, *columbo* and *camomile*. The *serpentaria virginiana*, possesses the joint qualities of tonic and antiseptic, and, as an aromatic stimulant, may be given with greater advantage when joined with the bark.

Bitters of the common kind may be administered with a good effect, such as HUXHAM'S or STOUGH-
TON'S elixirs, as tonics. Cold bathing may be used as a powerful tonic, by suddenly immersing the patient, and not suffering him to stay too long in the bath. But the most efficacious of all the tonics yet mentioned, is the Peruvian bark, given in large doses, at any time in the disease, nearly as much as the stomach will bear, and is in substance, preferable to decoctions or infusions, as great part of its strength is carried
off

off by exposure to heat in the form of fumes. Its well known efficacy is sufficient to recommend it, without entering into any farther detail of its virtues.

The well tried effects of the white poplar bark, set on wine, administered previous to the time of accession as a diaphoretic, is worthy of notice, with a view of affording relief when the Peruvian bark has either failed or cannot readily be procured.

By a strict attention to this sketch of the method of cure, and persevering in the use of either of these barks, there will be, no doubt, a solution of the disease.

Cleanliness may have a great share in expediting the cure of the patient, by frequently ventilating his chamber, and permitting him to breathe pure and wholesome air, the properties of which have not been vitiated by respiration, or impreg-

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nated with *mephitis*; together with a frequent change of bed-clothes and linen.

It may be advisable to rear a number of plants, in the vicinity of unhealthy habitations, for the purpose of absorbing the proportion of *mephitic* air arising from a supersaturation of the atmosphere, and, by changing its nature, act as a preservative, since, in the process of vegetation, they are known to emit a considerable quantity of vital air, necessary for human respiration, when under the influence of the sun, and, by imbibing the *azotic* or *mephitic* part, over and above saturation, will prevent its operation on the human body.

The surrounding atmosphere, from this chemical operation, will derive an advantage of sufficient importance, in the scale of health and disease, to claim the attention of each inhabitant of an unhealthy spot; and in a great measure, if not totally obviate the pernicious tendency of unsalubrious exhalation.

This

This concludes my observations on the method of cure, and completes the different heads of this dissertation. The disease has been traced to its origin; its symptoms and *genera* designated; its varied causes endeavoured to be discovered; the *data* established in order to form an opinion of its probable termination; and remedies suggested for its removal. These few ideas on the subject, hastily collected and imperfectly arranged in the midst of academic pursuits, I flatter myself, will sufficiently apologize, to the candid and liberal, for the many inaccuracies of this production. Should it reflect the smallest ray of light on a subject so important to the human race, my intent will be amply accomplished, and then I cannot but attribute it to the attentive assiduity of those gentlemen under whose guidance my professional studies have been pursued.

F I N I S.

Med. Hist.

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